

CRS Report for Congress

Received through the CRS Web

Gasoline Prices: Overview of Current Market Factors

September 12, 2003

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Summary

August 2003 saw sharp rises in gasoline prices; by month-end, the average U.S. retail price had set a new record of \$1.74 per gallon. The Department of Energy (DOE) announced that it was conducting an internal investigation of the price hikes to determine if there had been any market manipulation. The increases – featuring the largest one-day jump ever recorded – were quite large, occurred quickly, and were disproportionately greater than the increases in crude oil prices.

Was “market manipulation” at the root of this price fly-up? This question might best be answered when the results of the DOE study become available. Beyond this, however, lie a number of supply and demand factors that may all bear on the pump price situation. They include:

- Gasoline inventories are near bottom levels. The amount of gasoline that can actually be withdrawn from stocks is equal to less than one day of consumption.
- Crude oil inventories are equally low. Were refiners to be able to increase production, there would be little crude actually available from stocks to support increased plant utilization. On the world market, crude supplies are tight, reflecting political troubles in Venezuela and Nigeria, and the Iraqi situation. Production from the Organization of Petroleum Exporting Countries (OPEC) reflects a June quota cut.
- Refineries would be hard-pressed to increase output. Currently operating at 93% of nominal capacity – and having been run at full tilt for many months – refineries are experiencing unplanned outages. Combined with the impact of the August 14 electricity blackout, which caused some refinery downtime and disrupted transportation in one corner of the nation, supplies were extremely tight during the latter part of August, and this was reflected at the gas pump.
- Imports of finished gasoline and blending components are important. They were down during the summer of 2003, in part due to the Venezuelan situation.
- Gasoline demand reached record levels; an all-time high was reached in August.

Now that the summer driving season has ended, demand is just starting to trend lower. Combined with more gasoline imports attracted by high U.S. prices, supply and demand could re-balance at lower pump prices. How these factors play out during the last months of 2003 will provide insight into the future course of gasoline prices.

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Gasoline Prices: Overview of Current Market Factors

Introduction

Gasoline prices have been especially volatile since the start of 2003. Rising from the beginning of the year, pump prices set a record in March, before falling toward historic levels in April. But July saw upward movement, which accelerated quickly in August, when a new record price was set at \$1.74 per gallon.

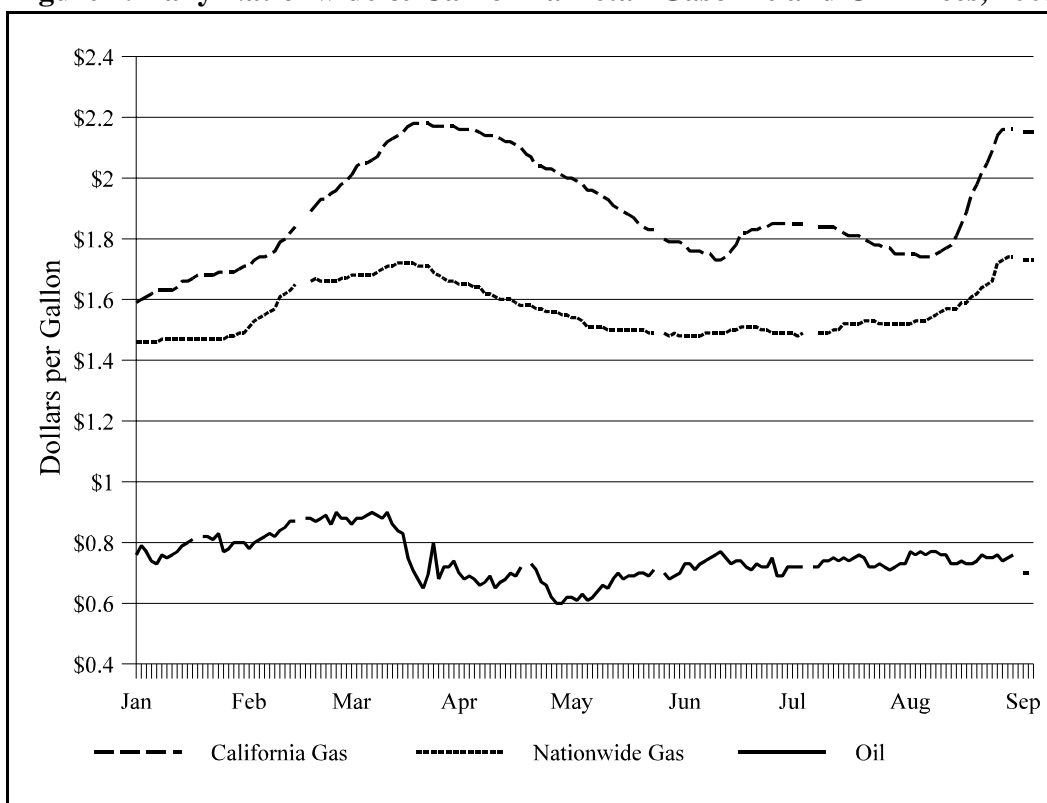
The July-August increases were extremely sharp, prompting the Department of Energy (DOE) to issue a statement on September 4, 2003, that it was conducting an internal investigation of the price hikes to determine if there had been any market manipulation. The increases – featuring the largest one-day jump ever recorded – were quite large, occurred quickly, and were disproportionately greater than the increases in crude oil prices. The DOE investigation may shed light on the market manipulation issue. Beyond this, there were a number of marketplace developments that bear on gasoline price rises. Included are extremely low inventories of both finished gasoline and crude oil, refinery capacity constraints and outages, and a drop in imports of foreign gasoline. Demand for gasoline also set records in August.

Now that the summer driving season has ended, demand is just starting to trend lower. Combined with more gasoline imports, attracted by high U.S. prices, supply and demand may re-balance at lower pump prices. How these factors play out during the last months of 2003 will provide insight into the future course of gasoline prices.

Gasoline Prices

According to the American Automobile Association (AAA) daily survey of retail gasoline prices around the country, gasoline prices nationwide have exceeded the highest figure ever recorded; at the end of August 2003 the U.S. average retail price stood at \$1.74 per gallon for regular grade. That is an increase from \$1.40 at the same time in 2002. The last time prices in this range were seen was in mid-March of 2003. After the March peak, prices slid to about \$1.50 before ramping up again in August. The August ramp-up featured a one-day jump in the national average of nearly 6 cents per gallon, an increase whose magnitude is almost unprecedented.

Figure 1 shows these statistics, along with prices for California. Also on Figure 1 as a reference point are crude oil prices, using the benchmark NYMEX traded crude oil, West Texas Intermediate (for delivery at Cushing, OK).

Figure 1. Daily Nationwide & California Retail Gasoline and Oil Prices, 2003

Sources: Retail gasoline prices: Oil Price Information Service, *Daily Fuel Gauge Report* online, sponsored by the American Automobile Association, <http://www.fuelgaugereport.com>

Spot oil prices: EIA, *Weekly Petroleum Status Report*, Table 14.

http://www.eia.doe.gov/oil_gas/petroleum/data_publications/weekly_petroleum_status_report/wpsr.html

According to AAA data, gasoline prices in California as of the end of August – \$2.15 per gallon – were approaching March’s record levels of \$2.17. Among the factors affecting California gasoline supply was the rupture of a 60,000-barrel-per-day product pipeline carrying supplies from Texas westward. The pipeline resumed partial operation on August 18, and – with supplemental throughput on other pipelines – lost capacity is reported to have been replaced.

The most important cost component of manufacturing gasoline is crude oil. Basically, every gallon of gasoline contains a gallon of crude, which is currently worth about 75 cents per gallon. That figure has been relatively stable since May, as Figure 1 suggests. Crude prices tracked the nationwide average gasoline price reasonably well between May and July. But in August, gasoline prices diverged from crude costs, pointing toward increased gross margins in the refining and marketing parts of the distribution chain that brings petroleum from the wellhead to the gas pump.

Gasoline prices are not regulated. While an oversimplification, gasoline prices are normally determined by supply and demand at the pump. In this situation, it appears that either demand for gasoline has been stronger than normal, supply weaker than typical, or a combination of the two. It appears that the latter was indeed characteristic of the gasoline market in late-summer 2003.

Gasoline Inventory Considerations

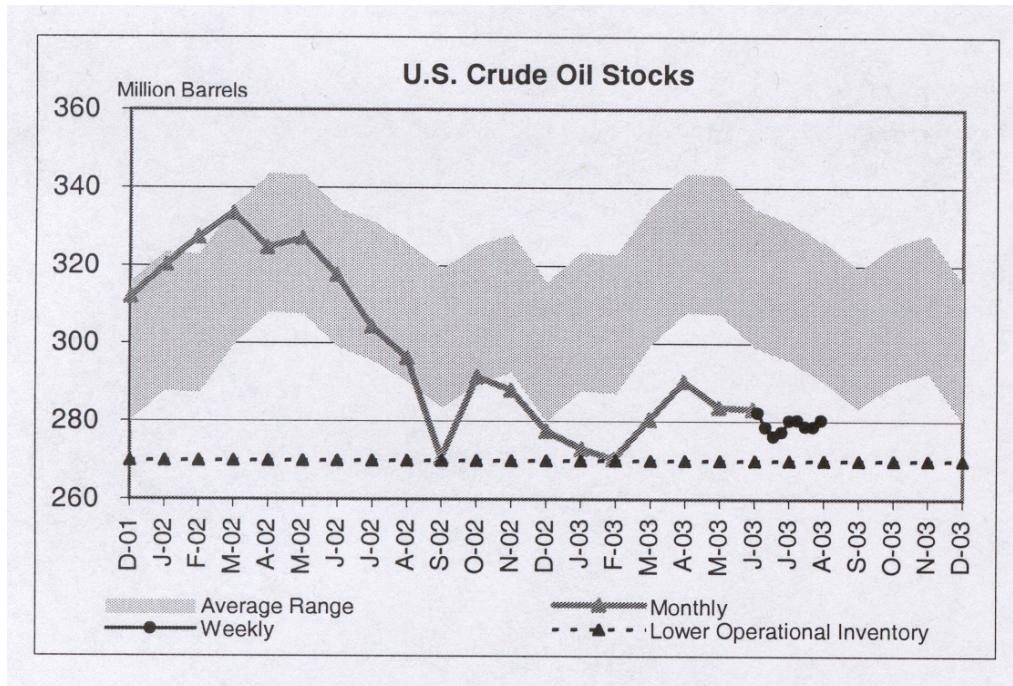
Refiners' stocks of gasoline have been falling since June 2003. They have declined from 209.9 million barrels at the beginning of that month to 191.2 million for the week of August 22.

The Department of Energy (DOE) places the "lower operational inventory" at 185 million barrels, or about 20 days of nominal supply. That is the level at which sporadic physical shortages begin to appear around the nation. The 185 million barrels figure can be thought of as the "fill" needed to keep the distribution system in normal operation. This amount cannot be drawn upon because it is needed to keep the gasoline supply system running. Therefore, it should not be thought of as available supply that can be withdrawn to meet demand at the pump.

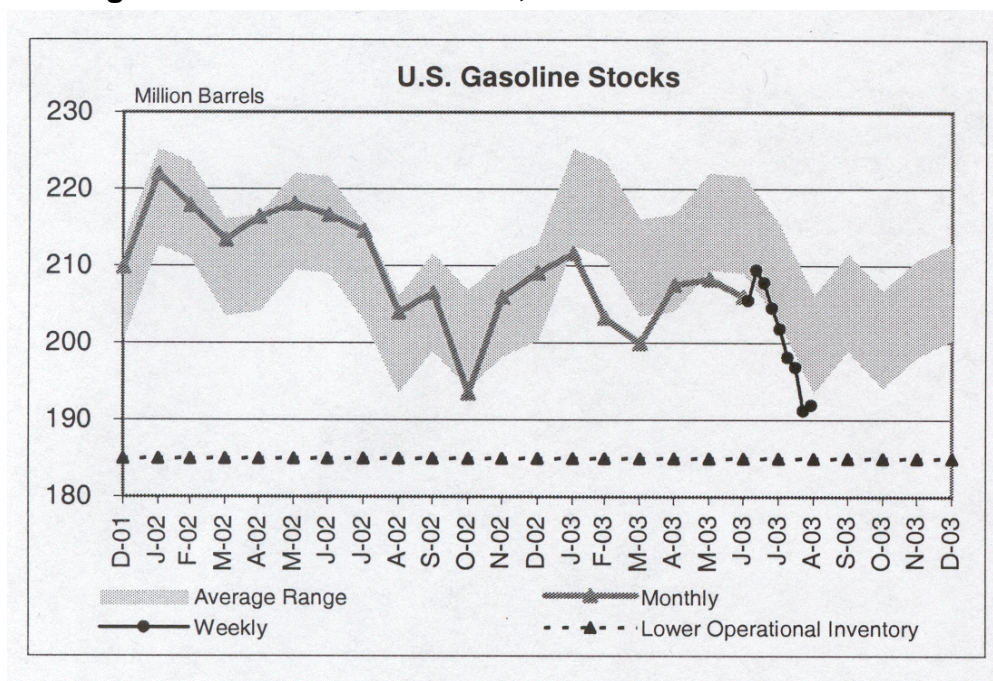
Late summer 2003 gasoline demand peaked at a 4-week average of about 9.4 million barrels per day (mbd). The difference between current stocks and DOE's minimum operating level – measured at about 6 million barrels – represent less than one day of supply available from refiners' stocks. Beyond this amount, spot shortages and "run-outs" are likely.

Crude Oil Inventory Considerations

What might be necessary for gasoline inventories to be replenished? Stock building depends on a number of factors on both sides of the supply-demand equation, including demand reduction and more gasoline imports. One key variable is the ability of refiners to manufacture more gasoline, which depends on the availability of both crude oil and the refining capacity to run it.

Figure 2. Stocks of Crude Oil, December 2001 to Present

Crude oil stocks have been at low levels during all of 2003, having touched minimum operating levels – 270 million barrels – twice in the past year. Currently in a downtrend, they ended August at 278 million barrels, indicating about half a day of ready availability based on refiners' crude use.

Figure 3. Stocks of Gasoline, December 2001 to Present

Refineries are currently operating at about 93.0% of capacity. The highest recent operating level is 95.8% for the month of May 2003, and this figure might actually represent maximum effective capacity. In recent months, the industry has been impacted by several refinery outages around the country, perhaps a result of continued high rates of operation leading to breakdowns. Given this, the May utilization rate might be difficult to achieve at all, not to mention to maintain for several consecutive months. It is highly unlikely that refineries collectively could operate at 100% capacity for anything other than a very short period.

In addition to the above considerations, the August 14, 2003, power outage resulted in the temporary loss of over 200,000 barrels per day of gasoline output for the week as some Eastern and Midwestern refineries had to shut down because of the electric supply interruption.¹

Were last May's 95.8% operating level to be reached, U.S. refineries could turn out another 500,000 barrels per day of refined product, with a significant share – perhaps half – being gasoline. This would, however, require additional crude oil to be available, which is not currently the case. Crude oil inventories are dependent on the availability of imports, and 2003 has seen curtailed output in three historically important U.S. suppliers – Iraq, Venezuela, and Nigeria. The situation in Iraq – which has not established a dependable flow of exports – is well known. But both Venezuela and Nigeria continue to see political unrest impacting the oil production sector, and neither country has re-achieved historic crude oil export levels.

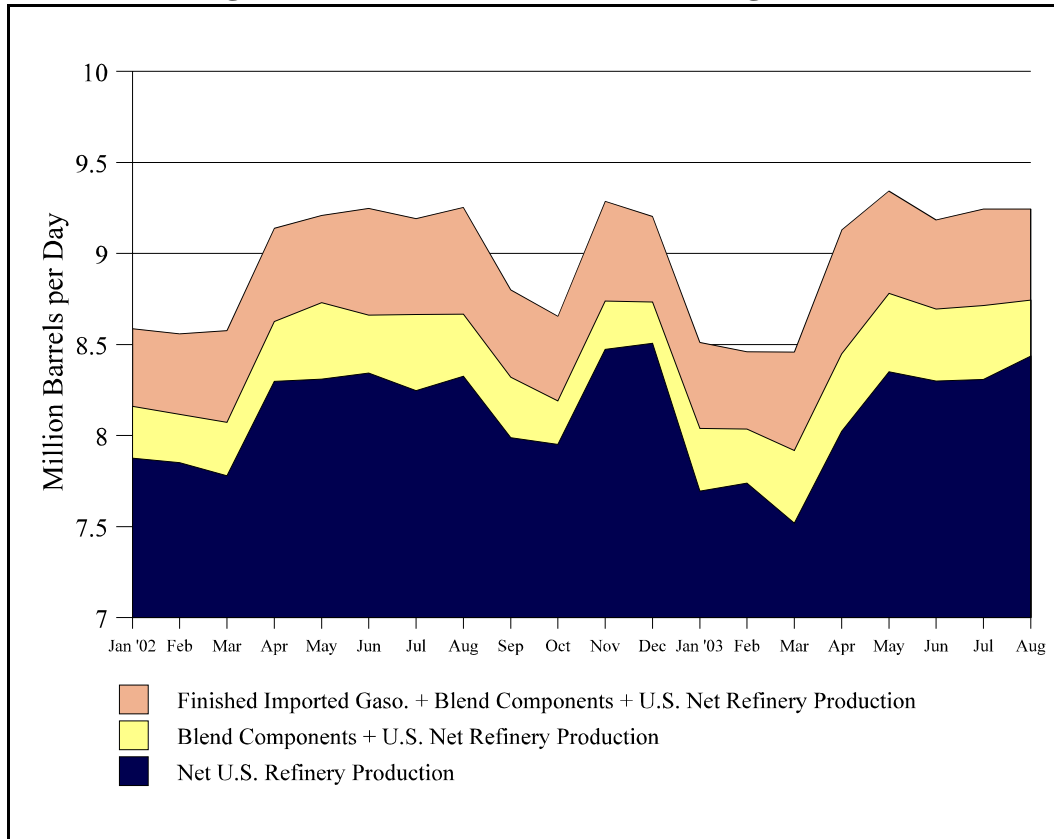
Gasoline Supplied to End Users – Production and Imports

There are two sets of gasoline supply figures to watch; the Products Supplied series compiled by DOE's Energy Information Administration (EIA), and new gasoline supply, a combination of imports of finished gasoline, gasoline blending components, and net U.S. refinery production of gasoline. In essence, the Products Supplied data show gasoline flowing to consumers from inventory. New supply data shows the amount of newly available gasoline – be it produced or imported – that may flow into inventories or directly supplied consumers.

Figure 4 shows new gasoline supplied to U.S. markets since the start of 2002. This consists of domestic refining production,² imports of finished gasoline that meets U.S. specifications, as well as a small, but significant, amount of blending components from refineries abroad.

¹“U.S. Gasoline Inventories off Sharply on Blackout Impact, Strong Demand.” *Platts Oilgram News*, August 28, 2003. Page 1.

² Defined as finished motor gasoline production at U.S. refineries minus imports of blending components, which are refined offshore.

Figure 4. Gasoline Production 2002 - August 2003

Source: Finished Imported Gasoline: EIA, *Petroleum Supply Monthly*, Table 54
 Blend Components: EIA, *Weekly Petroleum Status Report*, Table 9 (p.15)
 U.S. Net Refinery Production: see text of report.

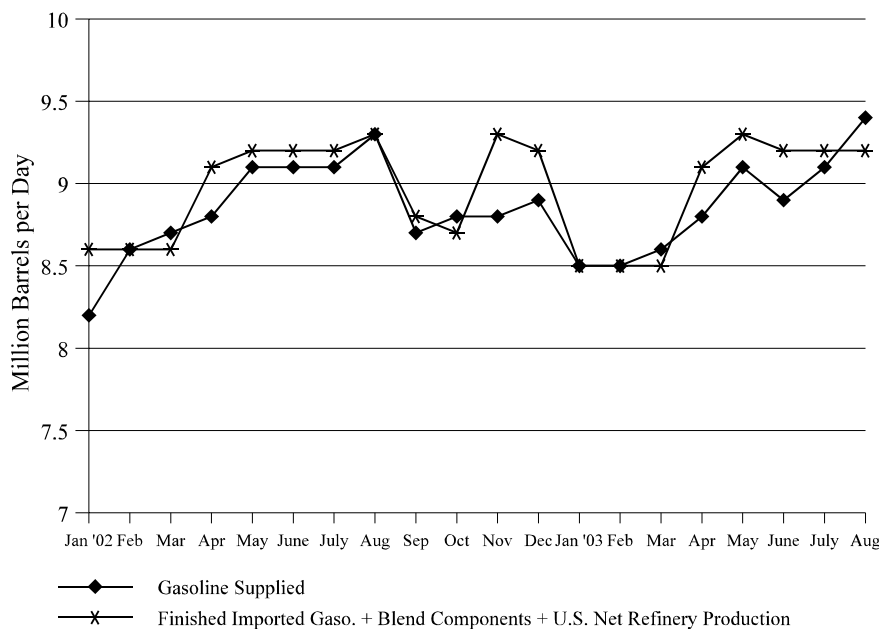
These imported blending components lend a complexity in tabulating the data on gasoline production. EIA includes the blending components in its series on refinery production, even though they are not produced in U.S. refineries. Blending components are added to gasoline supplies at refineries and terminals. They appear in the EIA data collected from refiners and terminal operators as if they were the output of U.S. refineries' manufacturing process, whereas they are really imported. EIA does this in order to avoid counting the components twice – as imports and as refinery output. Without these imports of blending components, gasoline supplied by U.S. refiners and terminal operators would likely diminish on a barrel-for-barrel basis. Once they are blended into the pool of U.S. refinery output in order to meet marketability standards they become part of U.S. gasoline supply, although they are not identified as imports per se. Figure 1 shows actual refinery gasoline production and imports of blending components and finished gasoline individually.

Imports of gasoline and components peaked at 1.1 mbd – including 426,000 barrels per day of components – in April 2003. They have declined steadily since then. At the end of August 2003, the figure was 800,000 barrels per day (306,000 bbl of components), a 300,000 decline from April's high. Meanwhile, actual "net" gasoline

manufacturing at U.S. refineries maintained a high level of about 8.4 mbd, as these refineries operated at 93% of capacity.

Venezuela has historically been a supplier of refined gasoline to the United States, but petroleum sector labor unrest has impinged on refining operations. U.S. gasoline supplies have suffered since late 2002, when a 2 month oil workers strike crippled production and refining. Reformulated gasoline (RFG) supplies in particular have suffered, with the year's first cargo shipped to the United States in June 2003.³ Venezuela, Platts notes, is planning to reduce exports in September, after having provided several cargoes to help out in the aftermath of the electrical blackout, which curtailed some U.S. refining operations.

Figure 5. New Gasoline Production and Gasoline Supply



Total gasoline supplied to end markets has risen consistently throughout 2003, peaking in August. The August peak is an often observed seasonal factor; in this case, it marks a divergence between new production and gasoline supplied to consumers. If seasonal consumption patterns prevail as they did in 2002, consumption should fall in September, and this may provide an opportunity for gasoline to flow into inventories.

Summary and Conclusion

Gasoline prices experienced two price spikes during 2003. As Figure 1 shows, prices rose from the \$1.40 area that prevailed during most of 2002. In part driven by rising crude oil prices, they peaked in March 2003, when crude oil prices began to

³Venezuela Plans Cut in RFG Exports to U.S.. *Platts Oilgram News*, August 29, 2003. p. 3.

decline, taking the national average back to \$1.50. But for California, the March price peak of \$2.17 stands as an all-time record.

Nationwide, the summer 2003 gasoline price spike really did not begin until late in the driving season, when gasoline prices spiked in August, setting a new record of \$1.74 on August 30. The rapidity of the rise – and the fact that gasoline prices diverged so greatly from crude oil prices – surprised motorists and policymakers alike. That gasoline prices rose, and crude really did not, may devolve from the fact that U.S. gasoline prices are determined by supply and demand at the gas pump, in contrast to crude prices, which are determined in the world market.

The crude-gasoline price divergence suggests that low U.S. gasoline inventories may be a factor. Indeed, available inventories are lower than popularly perceived. At the end of August, the amount of supply available without drawing stocks down to where spot shortages crop up was only about 6 million barrels. While 191 million barrels of gasoline inventory may seem ample, the readily available supply was only about 15 hours. Refineries' supply of crude oil is in similar condition. Were refineries to increase utilization, they would quickly face a need for more crude from world markets where there is little uncommitted crude.

Crude oil prices have not been as volatile as gasoline prices, despite a lack of availability as the Organization of Petroleum Exporting Countries (OPEC) appears to be holding near its June 2003 quota of 25.4 mbd. Troubles in Iraq and continued political unrest in Nigeria and Venezuela have also impacted world oil supply.

In addition to considerations related to imported crude oil, the United States also depends on imports of finished gasoline and gasoline blending components from refineries abroad. While imports declined through most of the summer – as Figure 4 shows – the most recent week reported by EIA (ending August 29, 2003) shows imports were nearly 1.2 mbd, a record and nearly 400,000 bd above the recent 4-week average. It might be expected that high U.S. prices might attract gasoline from abroad. Imports of both gasoline and blending components are needed to meet the appetite for gasoline, which exceeds refining capacity.

When inventories are this low, markets can easily become extremely volatile. The headline on the one page August 18 issue of *Platts Oilgram News*, shortened after the August 14 blackout, is suggestive: “Outages Stretch Into Second Day, Idle Refineries and Pipelines Across the Continent.” The story details extensive disruption and describes immediate gasoline price increases on the NYMEX and in trading in London. Even though the outage impacted only one corner of the nation, the disruption resulted in disproportionate and widespread price impact because inventories are so low.

Similarly, refinery outages have outsized impacts. With refineries having been run at high utilization rates for extended periods with deferred maintenance, unscheduled shutdowns, fires, and other disruptive mishaps have been more frequent during the past year. A recent issue of *Platts* contains a story entitled “Diesel

Terminals Empty Alongside Midwest Pipeline.”⁴ It details the impact of a fire at a 190,000-barrel-per-day Oklahoma refinery that took place six weeks earlier, leaving the plant operating at 50% capacity. *Platts* describes run-outs at terminals up the pipeline delivery system for this refinery, noting shortages at 16 terminals in Nebraska, North and South Dakota, and Iowa.

Gasoline demand has grown steadily all year, as Figure 5 shows. In August it averaged 9.4 mbd, a one-month record, having touched 9.7 mbd for one mid-month week. Amid a number of supply-side difficulties, record demand certainly helps explain why prices reached their recent highs.

However, seasonal factors will likely mitigate demand, which typically drops significantly in September as the summer driving season ends. Increasing gasoline supplies – especially from imported fuel and blending components – coupled with seasonally slack demand may give inventories a chance to rebuild. Figure 5 is illustrative – during 2002, gasoline demand declined over 500,000 barrels per day between August and September. This may well happen in 2003, taking pressure off prices.

⁴*Platts Oilgram Price Report*, August 29, 2003. Page 1.